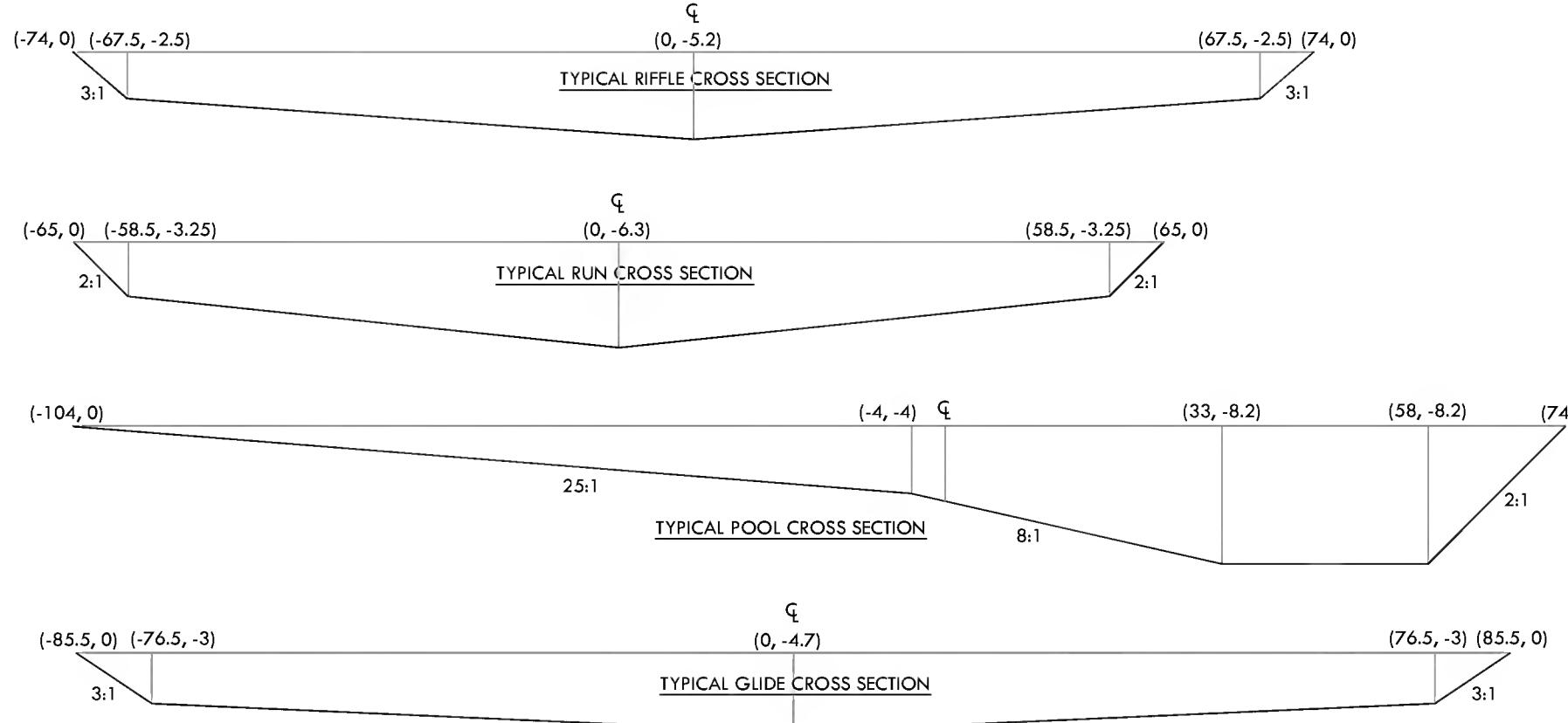


CFR3



BANKFULL CHANNEL DESIGN DIMENSIONS CFR3				
PARAMETER FEATURE	POOL	RIFFLE	RUN	GLIDE
DISCHARGE	3200 cfs	3200 cfs	3200 cfs	3200 cfs
WIDTH	163-193 ft	141-156 ft	120-142 ft	162-179 ft
MEAN DEPTH	2.9-3.4 ft	3.5-3.9 ft	4.1-4.8 ft	3.5-3.9 ft
MAX. DEPTH	7.4-11.1 ft	4.7-5.7 ft	5.9-6.7 ft	4.2-5.1 ft
SCOUR DEPTH	13 ft	5.9 ft	7.4 ft	5.3 ft
XS AREA	688 sq ft	550 sq ft	578 sq ft	605 sq ft
WIDTH:DEPTH	N/A	36-44	25-35	42-51

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull



SCALE: 1" = 20' H
SCALE: 1" = 10' V

TYPICAL CHANNEL CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348



WestWater Consultants, Inc.

River Design Group, Inc.
P.O. Box 1722
Whitefish, MT 59937
tel: (406) 862-4927
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www.riverdesigngroup.net



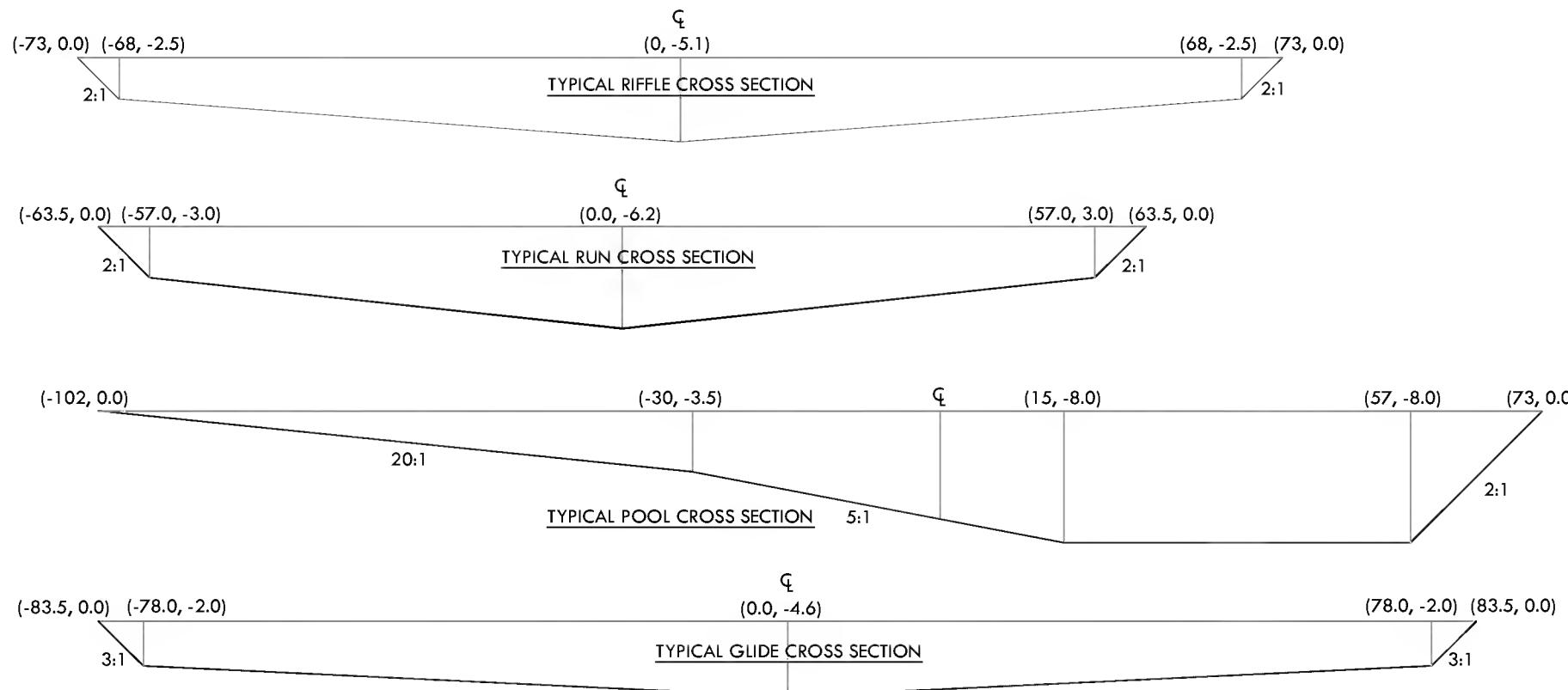
2	10-15-05	KLC	FINAL
1	03-29-05	MSD	DRAFT
NO.	DATE	BY	REVISION DESCRIPTION

DRAWN BY: NMW
DESIGNED BY: GTD/MSD
CHECKED BY: MSD
FILE NAME:
RDG-11X17.dwg

**SHEET
K-1**

PROJECT NO.: RDG-04-018

CFR 2

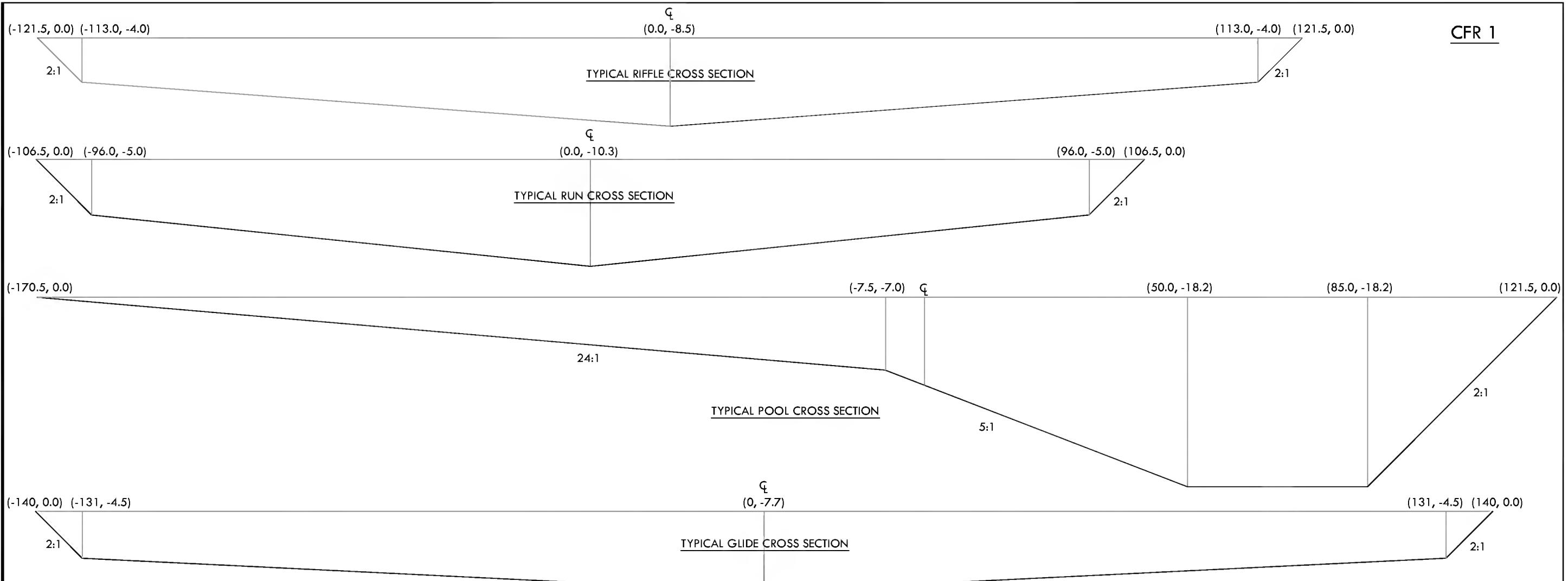


BANKFULL CHANNEL DESIGN DIMENSIONS CFR 2				
PARAMETER FEATURE	POOL	RIFFLE	RUN	GLIDE
DISCHARGE	3200 cfs	3200 cfs	3200 cfs	3200 cfs
WIDTH	160-189 ft	138-153 ft	118-139 ft	159-176 ft
MEAN DEPTH	2.8-3.3 ft	3.5-3.8 ft	4.0-4.7 ft	3.5-3.8 ft
MAX. DEPTH	7.3-10.9 ft	4.6-5.6 ft	5.8-6.6 ft	4.1-5.0 ft
SCOUR DEPTH	12.7 ft	5.8 ft	7.3 ft	5.2 ft
XS AREA	795 sq ft	530 sq ft	557 sq ft	583 sq ft
WIDTH:DEPTH	N/A	36-44	25-35	42-50

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull

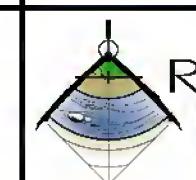
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		RESTORATION PLAN						
2	10-14-05	KLC	FINAL	DRAWN BY:	NMW	SHEET K-2	River Design Group, Inc. P.O. Box 1722 Whitefish, MT 59937 tel: (406) 862-4927 fax: (406) 862-4963 www.riverdesigngroup.net	
1	03-29-05	MSD	DRAFT	DESIGNED BY:	GTD/MSD			
NO.	DATE	BY	REVISION DESCRIPTION	CHECKED BY:	MSD	FILE NAME: RDG-11X17.dwg		
			PROJECT NO.:	RDG-04-018				

CFR 1

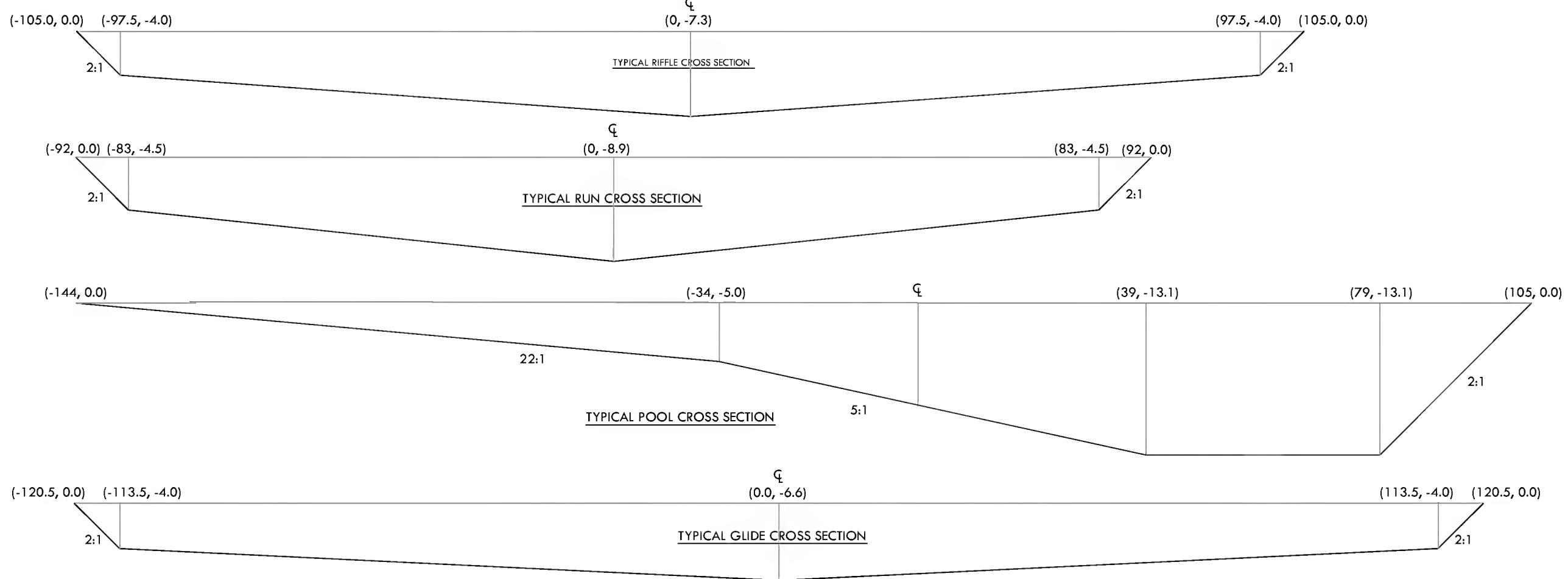


BANKFULL CHANNEL DESIGN DIMENSIONS CFR 1				
PARAMETER FEATURE	POOL	RIFFLE	RUN	GLIDE
DISCHARGE	10400 cfs	10400 cfs	10400 cfs	10400 cfs
WIDTH	268-316 ft	231-255 ft	197-232 ft	265-293 ft
MEAN DEPTH	4.7-5.5 ft	5.8-6.4 ft	6.7-7.9 ft	5.8-6.4 ft
MAX. DEPTH	12.2-24.3 ft	8.3-8.7 ft	9.7-10.9 ft	7.5-7.8 ft
SCOUR DEPTH	24.3 ft	9.1 ft	12.2 ft	8.2 ft
XS AREA	2220 sq ft	1480 sq ft	1554 sq ft	1628 sq ft
WIDTH:DEPTH	N/A	36-44	25-35	41-51

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull

<p>SCALE: 1" = 20' H SCALE: 1" = 10' V</p>	TYPICAL CHANNEL CROSS SECTIONS				<p>WestWater Consultants, Inc. 1112 Catherine Lane Corvallis, MT 59828 tel: (406) 961-3348</p> <p> WestWater Consultants, Inc.</p>		
	RESTORATION PLAN						
	DRAWN BY:		NMW	SHEET K-3			
	DESIGNED BY:		GTD/MSD				
	CHECKED BY:		MSD	FILE NAME: RDG-11X17.dwg			
	PROJECT NO.:		RDG-04-018				
	2	10-14-05	KLC	FINAL			<p>River Design Group, Inc. P.O. Box 1722 Whitefish, MT 59937 tel: (406) 862-4927 fax: (406) 862-4963 www.riverdesigngroup.net</p> <p> RIVER DESIGN GROUP, INC.</p>
	1	03-29-05	MSD	DRAFT			
	NO.	DATE	BY	REVISION DESCRIPTION			

CFR 1 - Right Channel @ Island Below Dam



BANKFULL CHANNEL DESIGN DIMENSIONS
CFR 1 Right Channel @ Island Below Dam

PARAMETER FEATURE	POOL	RIFFLE	RUN	GLIDE
DISCHARGE	10400 cfs	10400 cfs	10400 cfs	10400 cfs
WIDTH	231-273 ft	199-220 ft	169-200 ft	229-253 ft
MEAN DEPTH	4.0-4.8 ft	5.0-5.5 ft	5.8-6.8 ft	5.0-5.5 ft
MAX. DEPTH	10.5-15.7 ft	7.2-7.5 ft	8.4-9.4 ft	6.5-6.8 ft
SCOUR DEPTH	18.4 ft	7.9 ft	10.5 ft	7.1 ft
XS AREA	1650 sq ft	1100 sq ft	1155 sq ft	1210 sq ft
WIDTH:DEPTH	N/A	36-44	25-35	42-51

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull



SCALE: 1" = 20' H
SCALE: 1" = 10' V

TYPICAL CHANNEL CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
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WestWater Consultants, Inc.

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2	10-14-05	KLC	FINAL
1	03-29-05	MSD	DRAFT
NO.	DATE	BY	REVISION DESCRIPTION

DRAWN BY: NMW

DESIGNED BY: GTD/MSD

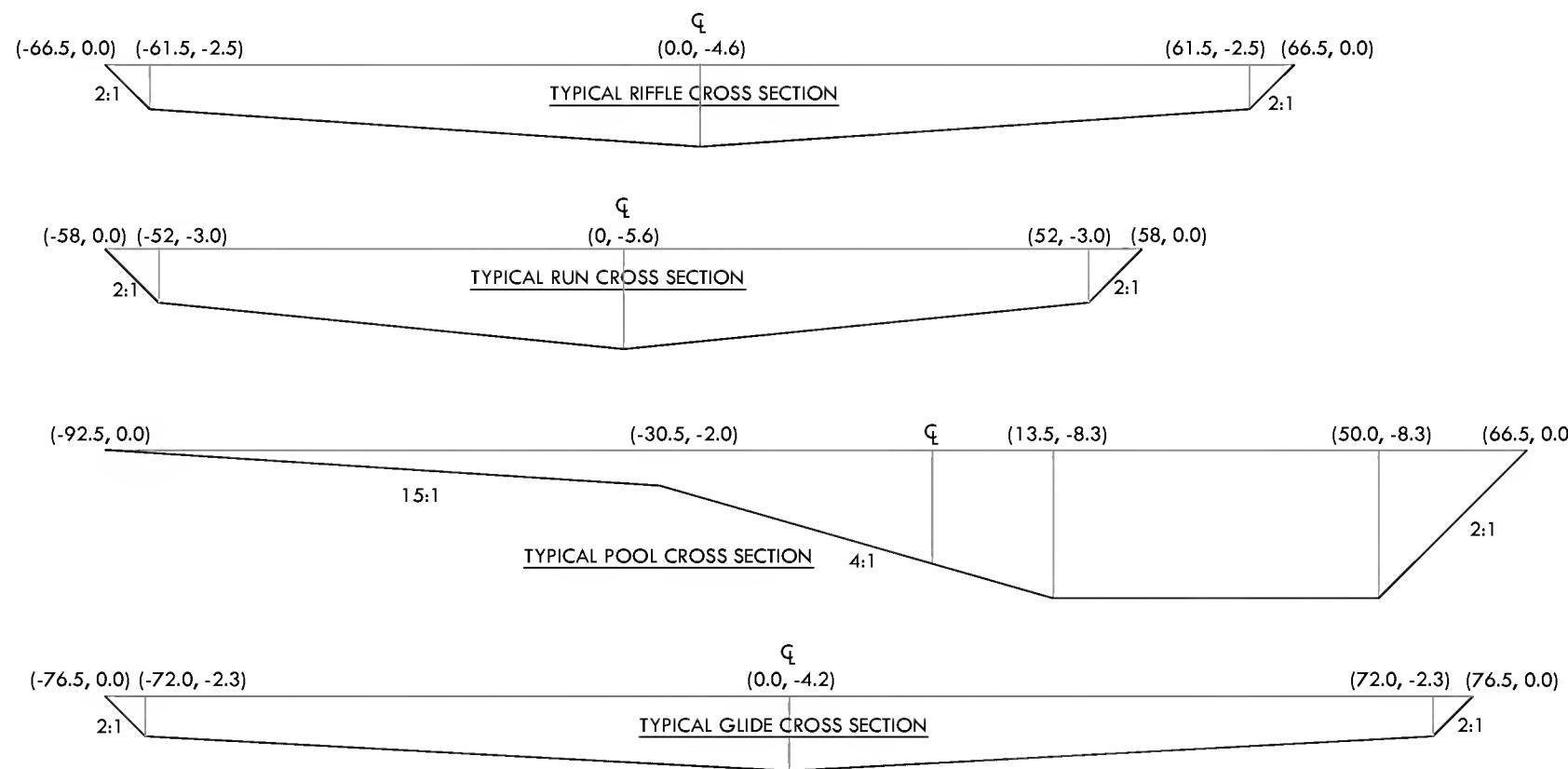
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FILE NAME:
RDG-11X17.dwg

**SHEET
K-4**

PROJECT NO.: RDG-04-018

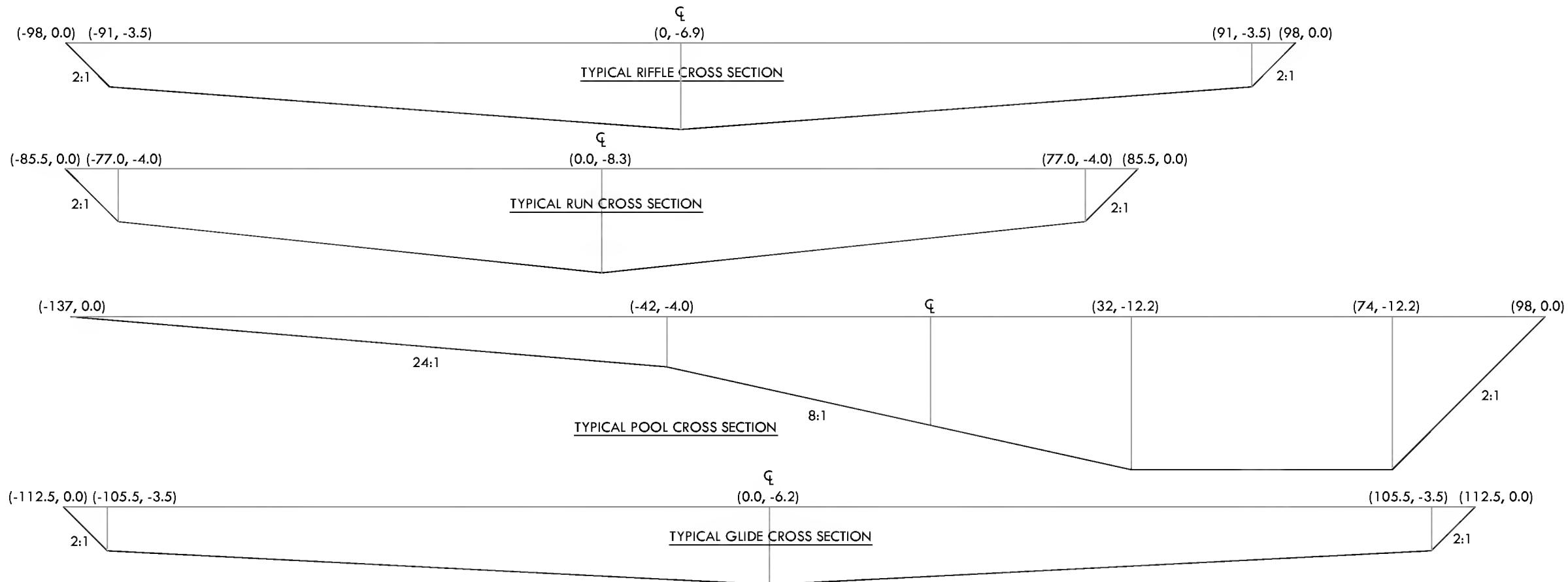
CFR 1 - Left Channel @ Island Below Dam



BANKFULL CHANNEL DESIGN DIMENSIONS CFR 1 - Left Channel @ Island Below Dam				
PARAMETER FEATURE	POOL	RIFFLE	RUN	GLIDE
DISCHARGE	10400 cfs	10400 cfs	10400 cfs	10400 cfs
WIDTH	146-172 ft	126-139 ft	107-127 ft	145-160 ft
MEAN DEPTH	2.6-3.0 ft	3.2-3.5 ft	3.6-4.3 ft	3.2-3.5 ft
MAX. DEPTH	6.6-9.9 ft	4.5-4.7 ft	5.3-6.0 ft	4.1-4.3 ft
SCOUR DEPTH	11.6 ft	5.0 ft	6.6 ft	4.5 ft
XS AREA	660 sq ft	440 sq ft	462 sq ft	484 sq ft
WIDTH:DEPTH	N/A	36-44	25-35	41-50

(x, y)
x - horizontal distance from channel alignment centerline
y - vertical difference in elevation from bankfull

 20 0 0 20 0 1 0 0	SCALE: 1" = 20' H SCALE: 1" = 10' V	TYPICAL CHANNEL CROSS SECTIONS				WestWater Consultants, Inc. 1112 Catherine Lane Corvallis, MT 59828 tel: (406) 961-3348		
		RESTORATION PLAN						
2	10-14-05	KLC	FINAL	DRAWN BY:	NMW	SHEET K-5	River Design Group, Inc. P.O. Box 1722 Whitefish, MT 59937 tel: (406) 862-4927 fax: (406) 862-4963 www.riverdesigngroup.net	
1	03-29-05	MSD	DRAFT	DESIGNED BY:	GTD/MSD			
NO.	DATE	BY	REVISION DESCRIPTION	CHECKED BY:	MSD	FILE NAME: RDG-11X17.dwg		RIVER DESIGN GROUP, INC.
				PROJECT NO.:	RDG-04-018			

BFR 1

BANKFULL CHANNEL DESIGN DIMENSIONS

BFR 1

PARAMETER FEATURE	POOL	RIFFLE	RUN	GLIDE
DISCHARGE	6200 cfs	6200 cfs	6200 cfs	6200 cfs
WIDTH	216-255 ft	186-206 ft	158-187 ft	214-236 ft
MEAN DEPTH	3.8-4.5 ft	4.7-5.2 ft	5.4-6.4 ft	4.7-5.2 ft
MAX. DEPTH	9.8-14.7 ft	6.2-7.5 ft	7.8-8.8 ft	5.6-6.7 ft
SCOUR DEPTH	17.1 ft	7.8 ft	9.8 ft	7.1 ft
XS AREA	1440 sq ft	960 sq ft	1008 sq ft	1056 sq ft
WIDTH:DEPTH	N/A	36-44	25-35	41-50

(x, y)
 x - horizontal distance from channel alignment centerline
 y - vertical difference in elevation from bankfull



SCALE: 1" = 20' H
 SCALE: 1" = 10' V

TYPICAL CHANNEL CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
 1112 Catherine Lane
 Corvallis, MT 59828
 tel: (406) 961-3348



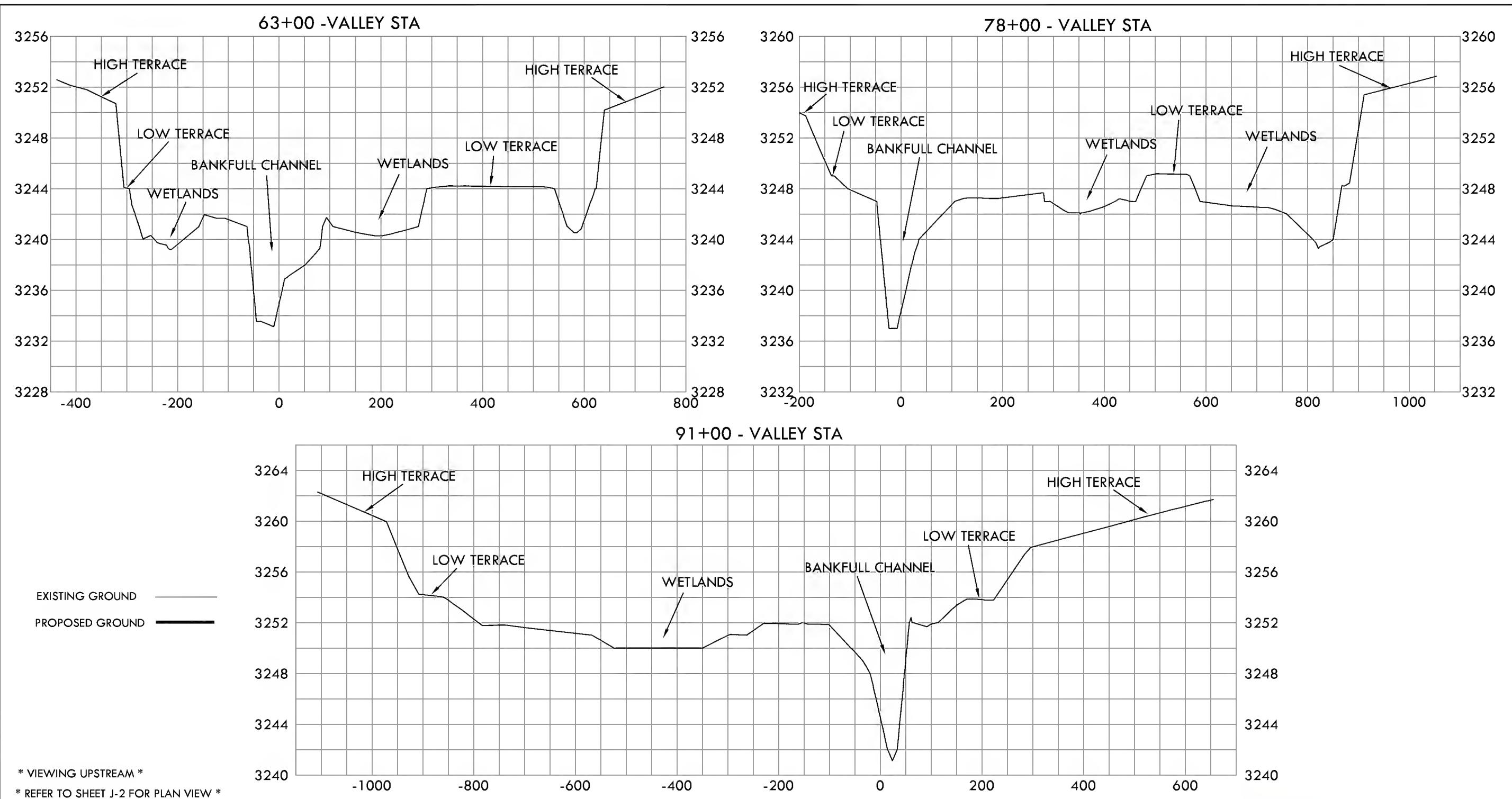
WestWater Consultants, Inc.

River Design Group, Inc.
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 Whitefish, MT 59937
 tel: (406) 862-4927
 fax: (406) 862-4963
www.riverdesigngroup.net

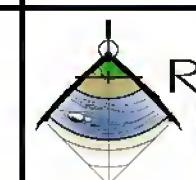


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1	03-29-05	MSD	DRAFT
NO.	DATE	BY	REVISION DESCRIPTION

DRAWN BY:	NMW	SHEET K-6	
DESIGNED BY:	GTD/MSD		
CHECKED BY:	MSD	FILE NAME: RDG-11X17.dwg	
PROJECT NO.:	RDG-04-018		

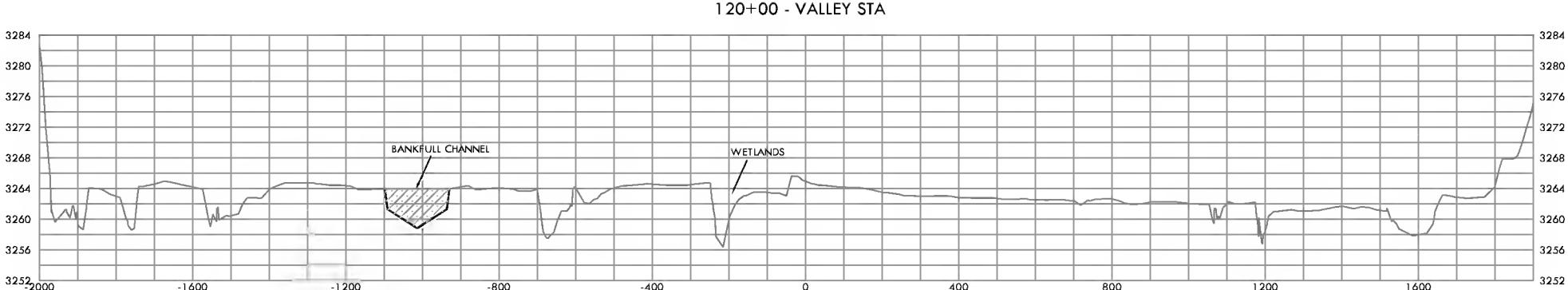
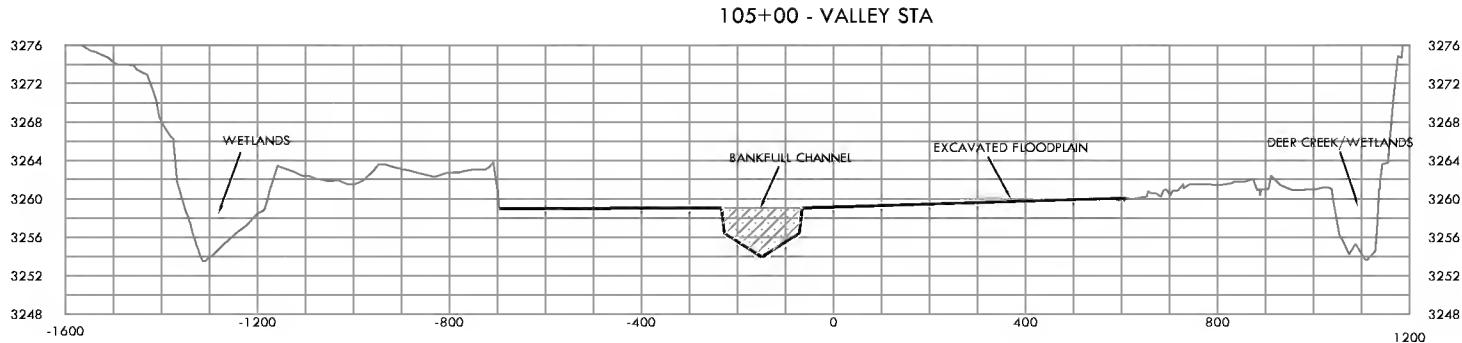
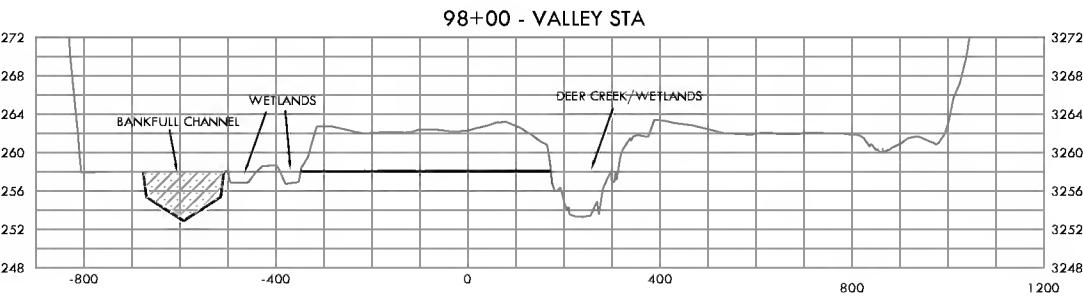


WestWater Consultants, Inc.

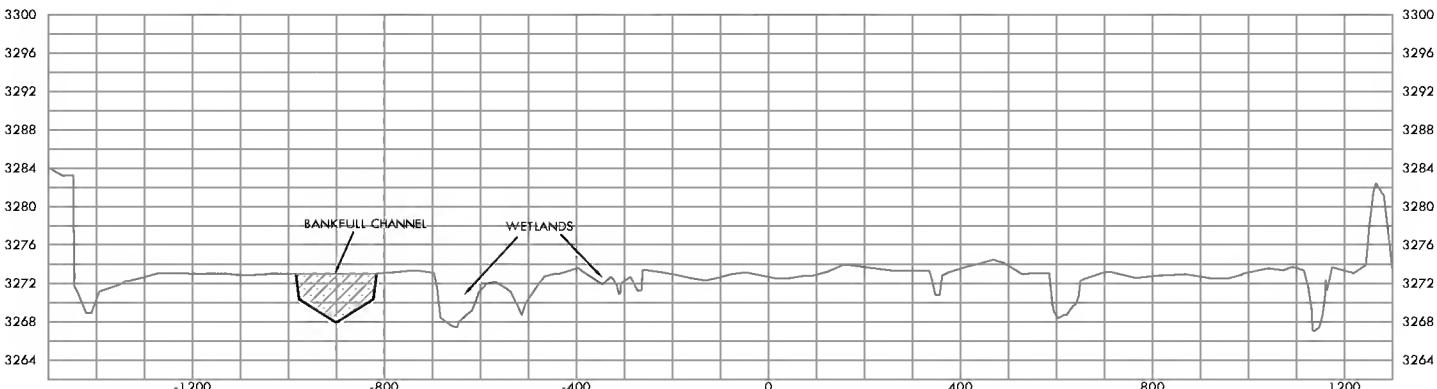


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Whitefish, MT 59937
tel: (406) 862-4927
fax: (406) 862-4963
www.riverdesigngroup.net

 <p>SCALE: 1" = 200' H SCALE: 1" = 8' V</p>				CFR 2 - VALLEY CROSS SECTIONS <hr/> RESTORATION PLAN				<i>WestWater Consultants, Inc. 1112 Catherine Lane Corvallis, MT 59828 tel: (406) 961-3348</i>
				DRAWN BY:	NMW	SHEET K-7		
2	10-14-05	KLC	FINAL	DESIGNED BY:	GTD/MSD			
1	03-29-05	MSD	DRAFT	CHECKED BY:	MSD			
NO.	DATE	BY	REVISION DESCRIPTION	PROJECT NO.:	RDG-04-018			FILE NAME: RDG-11X17.dwg

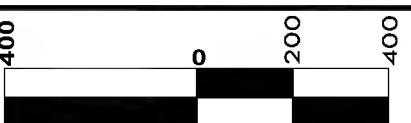


150+00 - VALLEY STA



EXISTING GROUND _____
PROPOSED GROUND _____

* VIEWING UPSTREAM *
* REFER TO SHEET J-2 & J-3 FOR PLAN VIEW *



SCALE: 1" = 400' H
SCALE: 1" = 20' V

CFR 3 - VALLEY CROSS SECTIONS

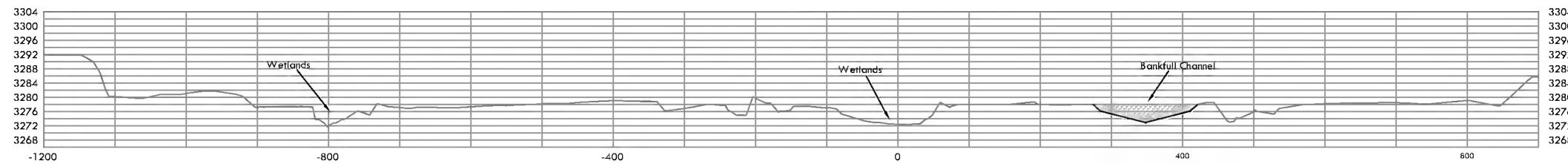
RESTORATION PLAN

WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348

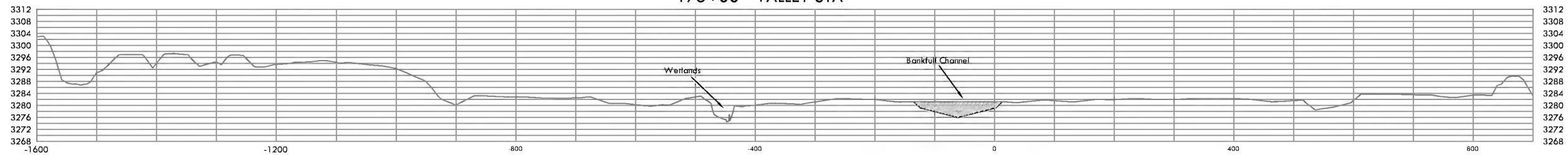


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2	10-14-05	KLC	FINAL		DESIGNED BY:	GTD/MSD	SHEET K-8
1	03-29-05	MSD	DRAFT		CHECKED BY:	MSD	
NO.	DATE	BY	REVISION DESCRIPTION		FILE NAME:	RDG-11X17.dwg	
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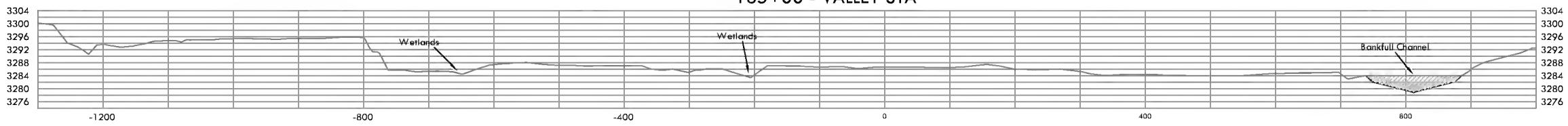
165+00 - VALLEY STA



175+00 - VALLEY STA



185+00 - VALLEY STA

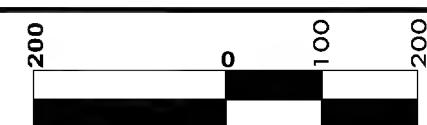


EXISTING GROUND _____

PROPOSED GROUND _____

* VIEWING UPSTREAM *

* REFER TO SHEET J-3 FOR PLAN VIEW *



SCALE: 1" = 200' H
SCALE: 1" = 40' V

CFR 3 - VALLEY CROSS SECTIONS

RESTORATION PLAN

2 10-14-05 KLC FINAL

1 03-29-05 MSD DRAFT

NO. DATE BY REVISION DESCRIPTION

DRAWN BY: NMW

DESIGNED BY: GTD/MSD

CHECKED BY: MSD

PROJECT NO.: RDG-04-018

**SHEET
K-9**

FILE NAME:
RDG-11X17.dwg

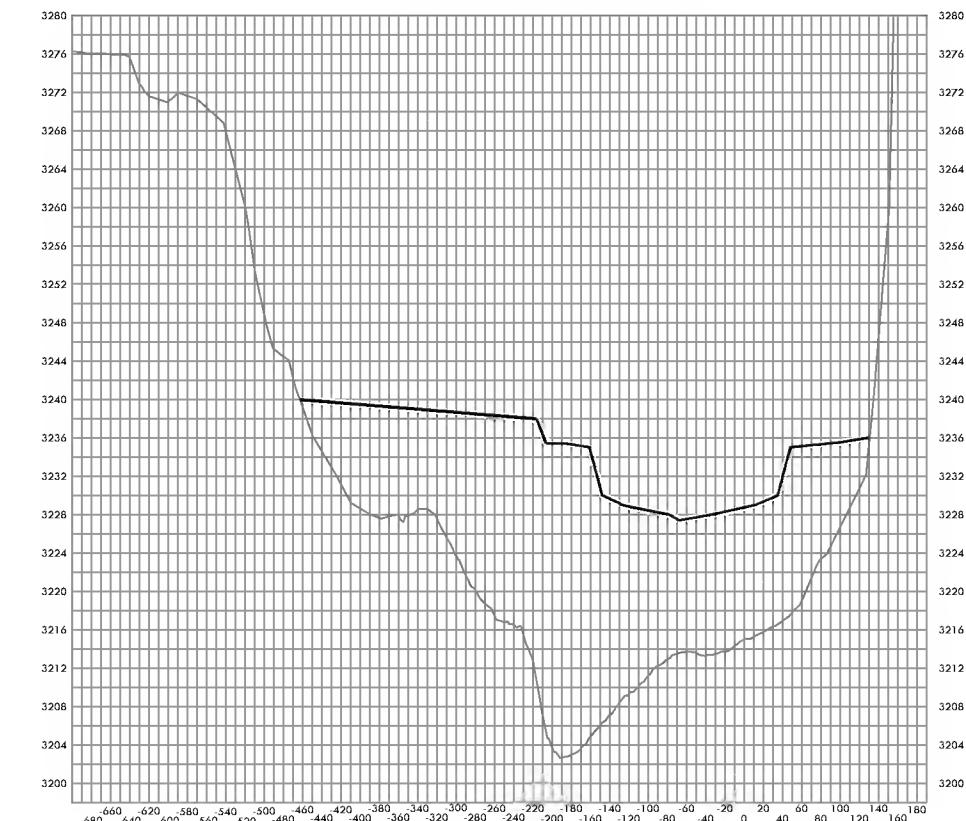
WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348



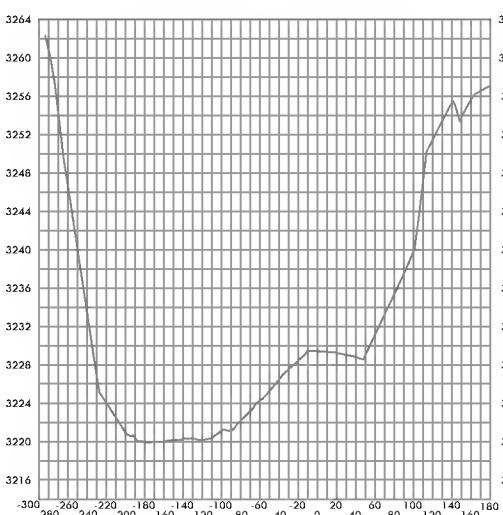
River Design Group, Inc.
P.O. Box 1722
Whitefish, MT 59937
tel: (406) 862-4927
fax: (406) 862-4963
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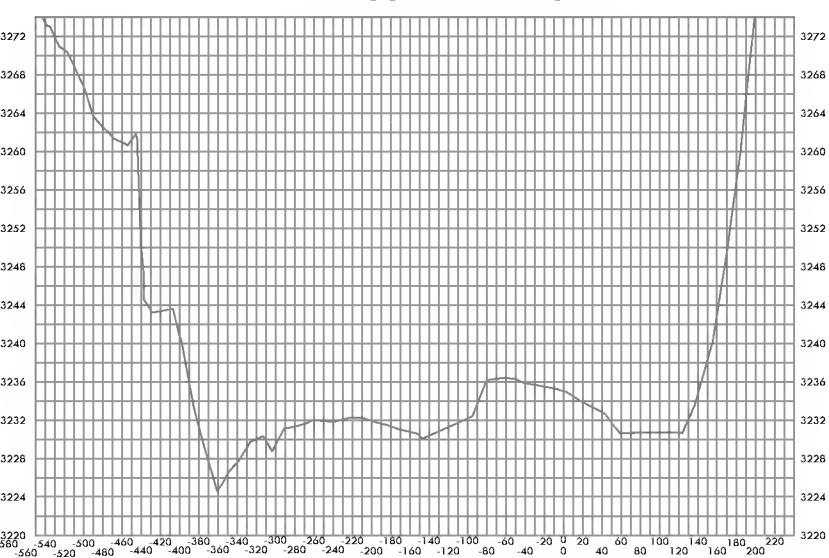
45+00 - VALLEY STA



27+00 - VALLEY STA



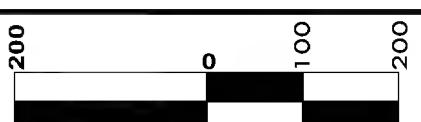
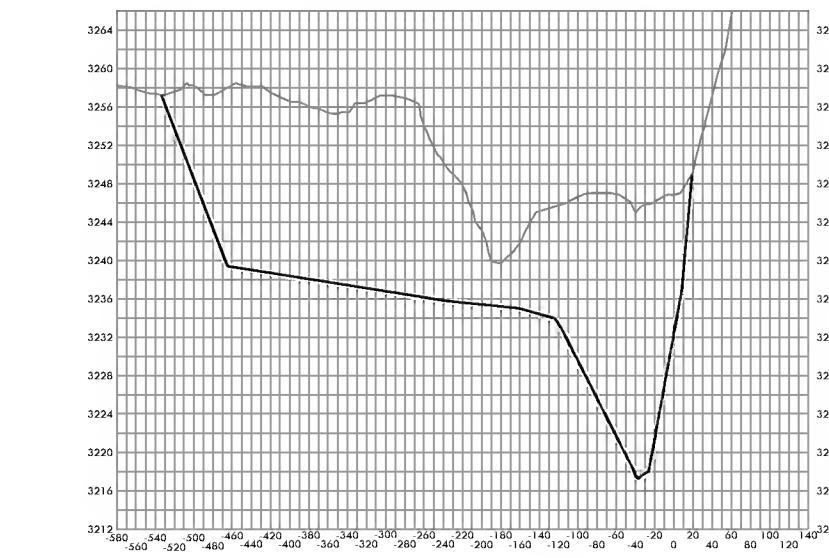
41+00 - VALLEY STA



EXISTING GROUND _____
PROPOSED GROUND _____

* VIEWING UPSTREAM *
* REFER TO SHEET J-1 FOR PLAN VIEW *

50+00 - VALLEY STA



SCALE: 1" = 200' H
SCALE: 1" = 20' V

CFR 1 - VALLEY CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
tel: (406) 961-3348



River Design Group, Inc.
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Whitefish, MT 59937
tel: (406) 862-4927
fax: (406) 862-4963
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200	0	100	200

SCALE: 1" = 200' H
SCALE: 1" = 20' V

2	10-14-05	KLC	FINAL
1	03-29-05	MSD	DRAFT

NO.	DATE	BY	REVISION DESCRIPTION
			PROJECT NO.: RDG-04-018

DRAWN BY: NMW

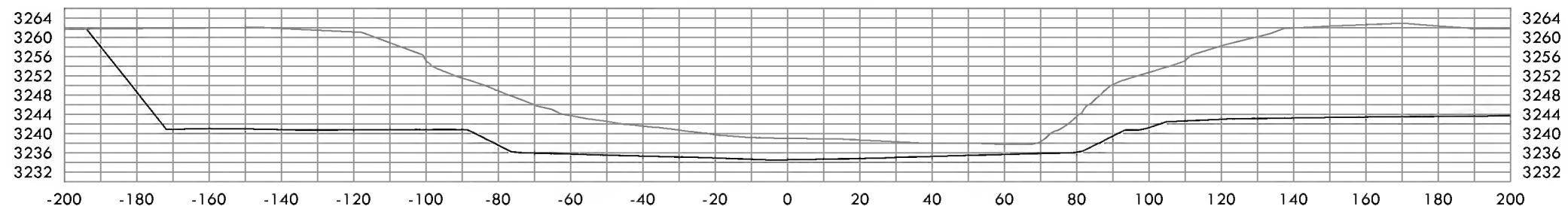
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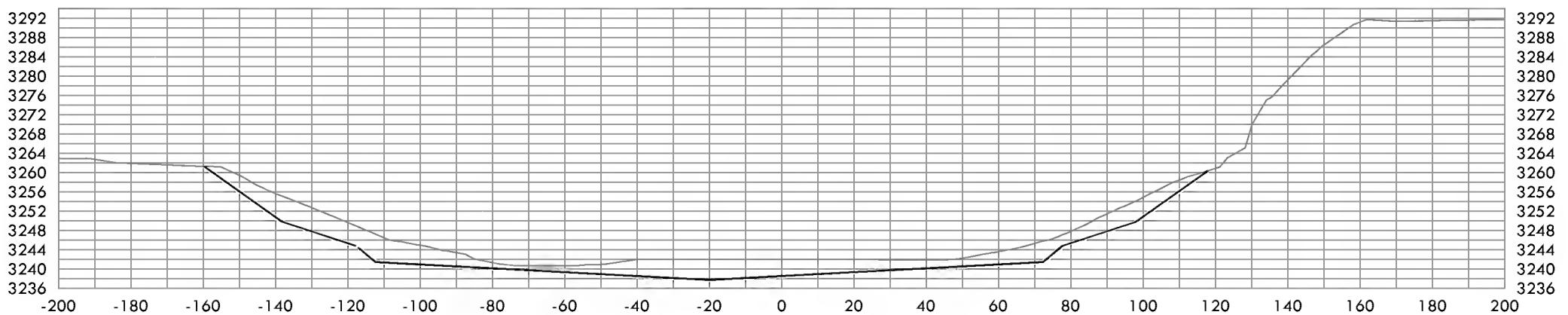
FILE NAME:
RDG-11X17.dwg

**SHEET
K-10**

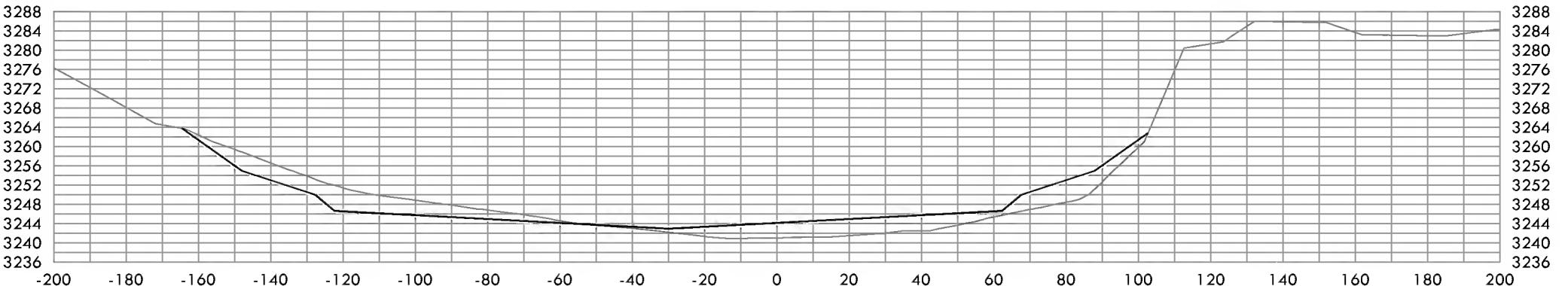
7+00 - BFR STA



20+00 - BFR STA

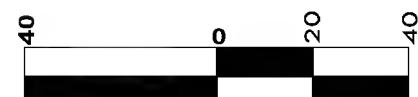


40+00 - BFR STA



EXISTING GROUND _____
PROPOSED GROUND _____

* VIEWING UPSTREAM *
* REFER TO SHEET I-5 FOR PLAN VIEW *



SCALE: 1" = 40' H
SCALE: 1" = 30' V

BFR 1 - VALLEY CROSS SECTIONS

RESTORATION PLAN

WestWater Consultants, Inc.
1112 Catherine Lane
Corvallis, MT 59828
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NO.	DATE	BY	REVISION DESCRIPTION
2	10-14-05	KLC	FINAL
1	03-29-05	MSD	DRAFT

DRAWN BY:	NMW	SHEET K-11	
DESIGNED BY:	GTD/MSD		
CHECKED BY:	MSD		
PROJECT NO.:	RDG-04-018	FILE NAME: RDG-11X17.dwg	